

# Transients From The Palomar-Quest Survey

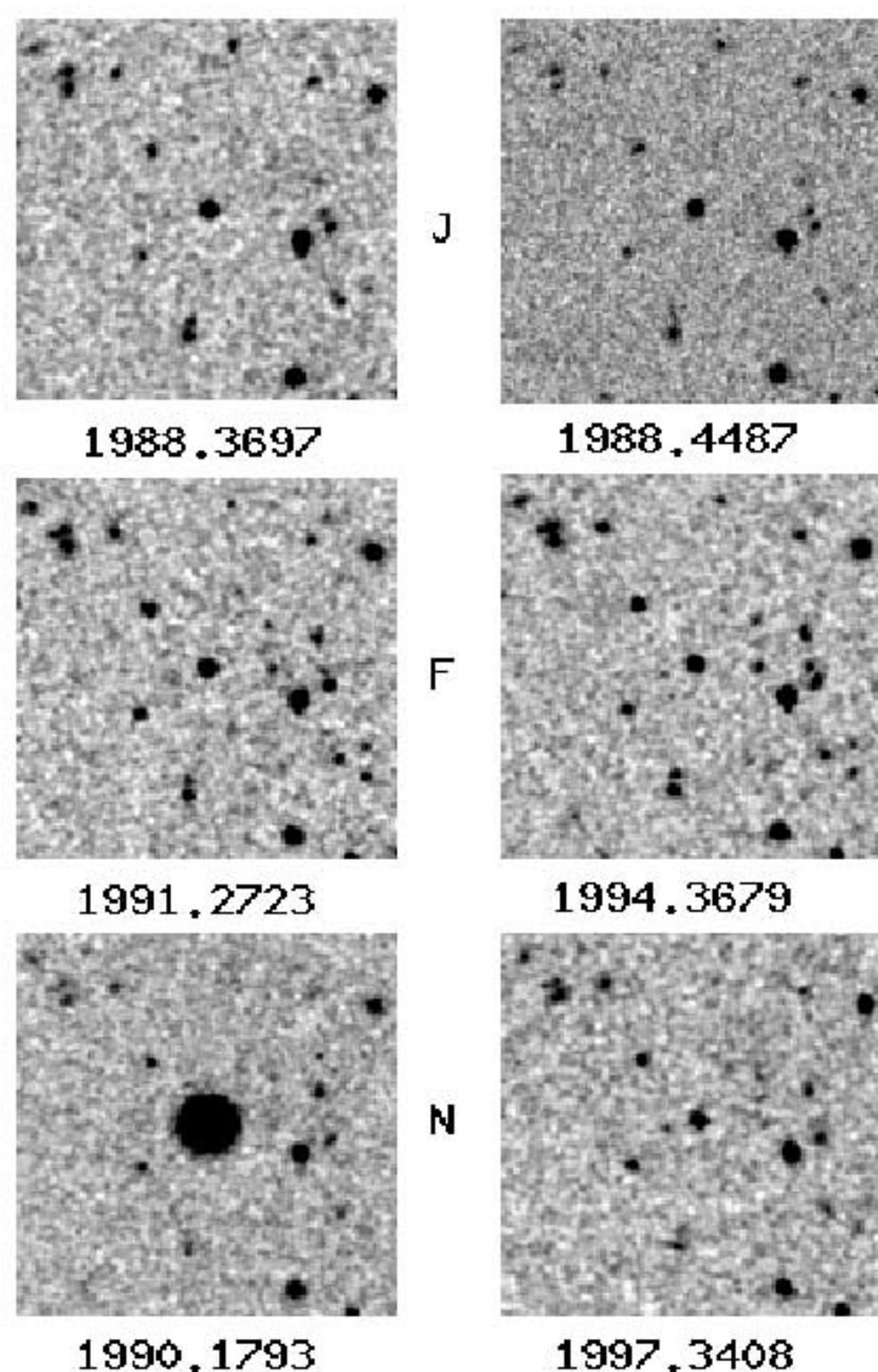
**A. Mahabal, S.G. Djorgovski, M. Graham, R. Williams, B. Granett,  
M. Bogosavljevic (Caltech), C. Baltay, D. Rabinowitz, A. Bauer, P. Andrews,  
N. Morgan, J. Snyder, N. Ellman, S. Duffau (Yale), J. Musser, S. Mufson,  
M. Gebhard (Indiana U.), R. Brunner, A. Rengstorf (NCSA/UIUC)**

## Abstract

Exploration of the time domain is rapidly becoming one of the most exciting areas of astronomy. The Palomar-Quest synoptic sky survey has recently started producing a steady stream of data. Some salient features of the survey are:

- 112 CCDs yielding 4.6 degree wide Dec strips in drift-scan mode totalling about 500 sq. degrees per night at better than 1 arcsec per pixel
- 12 to 15 nights per month
- Declination range from -25 to +30 degrees
- Near simultaneous observations in one of two filter sets: Johnson-Cousin's *UBRI* and SDSS *r'i'z'z'*
- time baselines for repeats ranging from days to months, anticipated to extend to multi-year time scales over the next 3 to 5 years or beyond.

The unprecedented amount of data makes this the largest synoptic survey of its kind both in terms of area covered and depth.

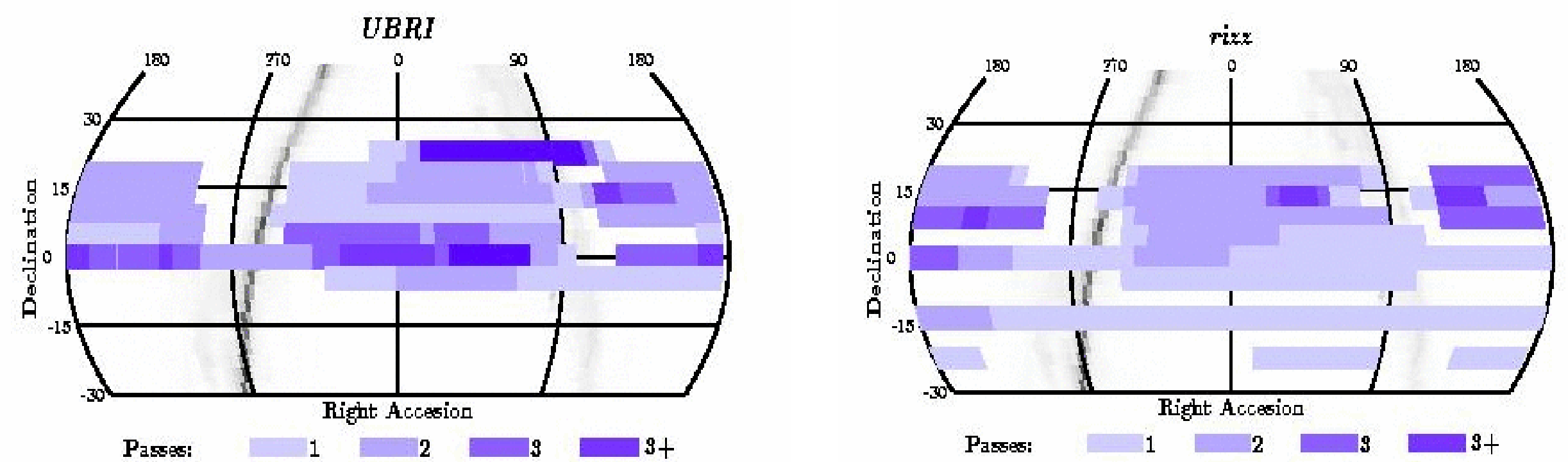


Our best transient to date, PVO 1558+3725 had brightened by a factor of 300 in the N plate (DPOSS) taken on 1990.1793 UT. Its subsequent spectroscopy shows normal early-type absorption spectrum, with no line emission. The cause, amplitude and the duration of the outburst are unknown. How many normal stars do this, how often, and why?

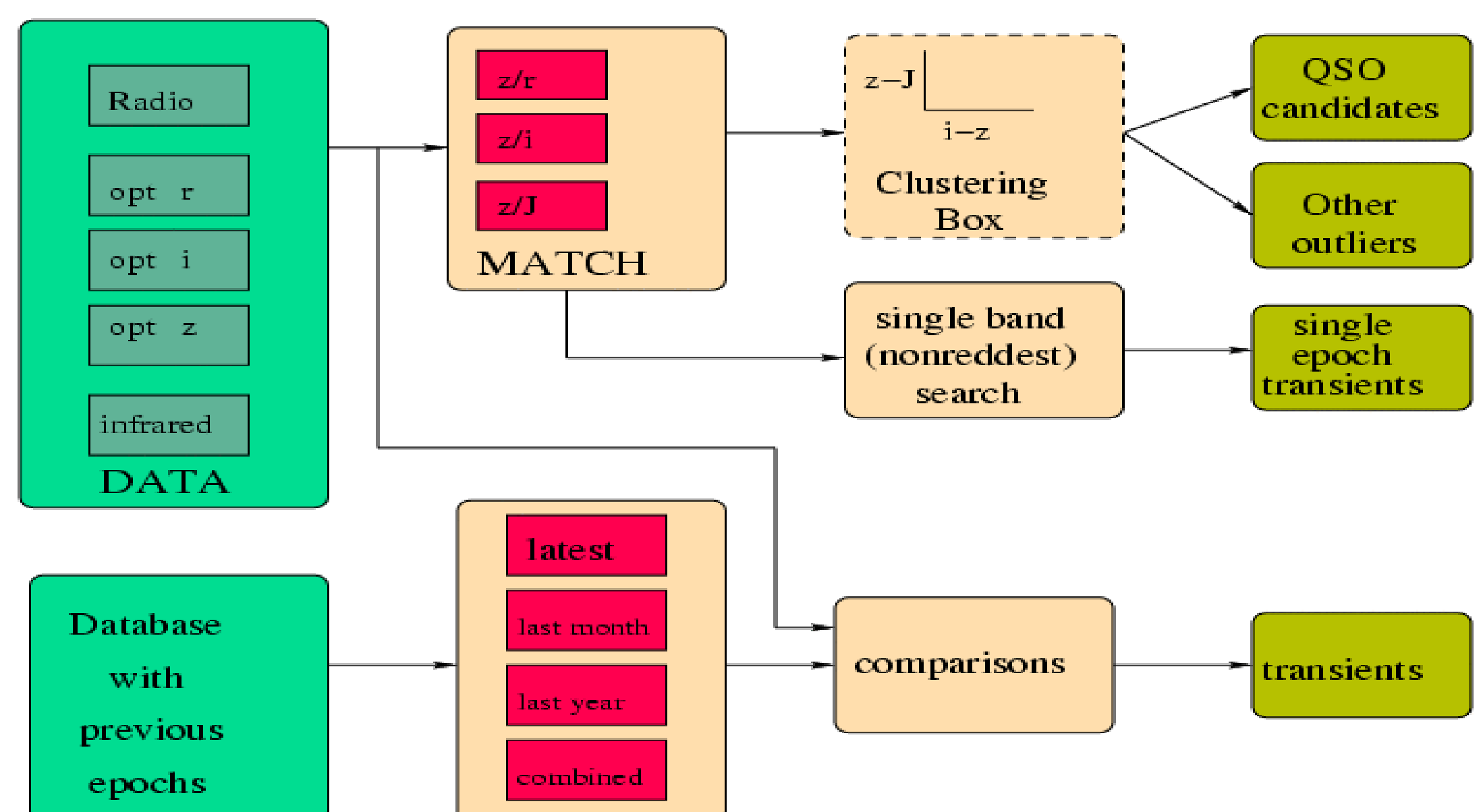
The type of sources we expect to find include:

- Supernovae
- Variable AGN
- GRB (orphan) afterglows
- Cataclysmic Variables
- Interesting stellar flares
- Novae
- Other types of variable stars
- Possibly new types of objects/phenomena

## Data Taken



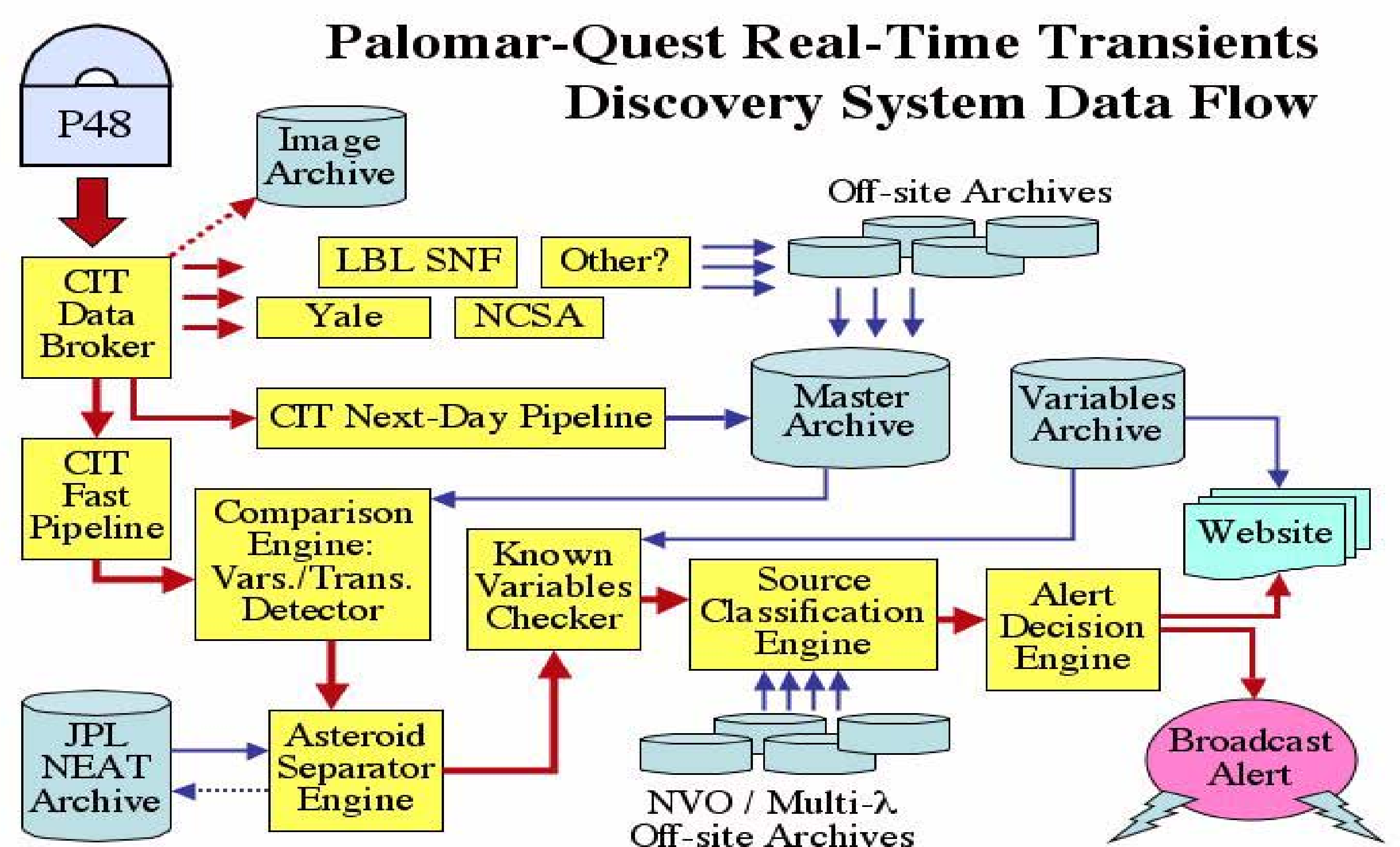
Data taken in the *UBRI* and *r'i'z'z'* filter sets. Several thousand square degrees have been covered so far in both sets. 4500 sq. degrees have been covered at least twice in *UBRI* and 4700 sq. degrees in *r'i'z'z'*. Deeper color indicates regions observed more times.



Besides the *UBRI* and *r'i'z'z'* filters used with QUEST, we will also be comparing our data with other bands like JHK of 2MASS. An ongoing JPL collaboration will help catch known asteroids.

We are in the process of designing a real-time data reduction pipeline which would enable a rapid discovery and spectroscopic follow-up of transients and other interesting objects. Particular emphasis will be on eliminating spurious candidates so that the number of alerts generated is of the order of one per week.

This survey can be seen as a precursor for the even larger synoptic sky surveys with LSST and PanSTARRS and it will prepare us for them.



**<http://www.astro.caltech.edu/quest>**